WORLD BILL ACCEPTOR

WBA-12-SS
WBA-13-SS
WBA-22-SS
WBA-23-SS
WBA-24-SS2
WBA-25-SS2

CHAPTER 7

Calibration
Downloading to Flash Memory

Date: July 2007

JAPAN CASHMACHINE CO., LTD.

Copyright © 1998-2003 Japan Cash Machine Co. Ltd. All rights reserved.

Contents

1. Description - calibration P1
2. Tools Needed P1
3. Enable Calibration Mode P1
4. When using MS-DOS Calibration Program (ADJX0.exe) P2
5. MS-DOS Calibration procedure P2
6. When using Windows Calibration Program (AdjMenu(V***).exe P.10
7. Error messages P.11
8. Sensor name and sensor name conversion table P16
9. Description - downloading to flash memory P16
10. Tools needed P17
11. Enable WBA Download Mode P17
12. Starting the download program P17
13. When using MS-DOS Download Program (DWN.exe) P18
14. MS-DOS Download procedure P19
15. When using Windows Download Program (DOWNLOAD(V1.2*).exe) P21
16. Setting the WBA DIP Switches P22
17. Error Code P24
18. Sensor, board, and motor locations P26

1. Description - calibration

Calibration sets a starting reference point for all the optical and magnetic sensors within the unit. This task can be done at the host unit or at your workbench.

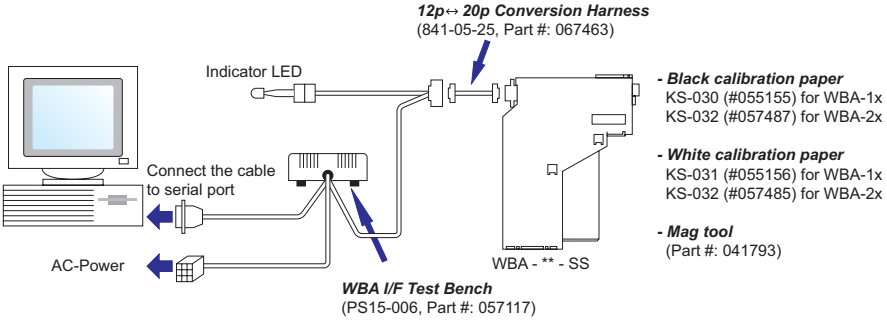
WHEN TO CALIBRATE

- After the acceptor component has been disassembled for repair
- After a sensor board has been replaced
- Whenever bill acceptance is degraded
- Once a year

2. Tools needed

You will need the following tools to calibrate your WBA.

Tools needed to calibrate your WBA

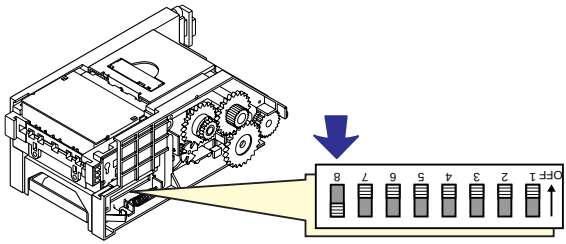


PC: IBM PC AT or compatible
OS: MS-DOS V5.x/6.x or Windows 98/2000/XP

3. Enable Calibration Mode

(1) Refer to the diagram above to properly connect the cables / harnesses.

Make sure the power of PS15-006 / host machine is OFF when connecting the harness to the WBA. Failure to do so may cause electric shock and/or permanent damage to the equipment.



(2) Set DIP switch No.8 ON and 1 to 7 OFF.
(3) Supply power to the WBA.
(4) The indicator LED flashes approximately every second.
(5) Set DIP switch No.8 OFF. Confirm the indicator LED turns off.

4. When using MS-DOS Calibration Program (ADJX0.exe)

There are 2 ways to start the WBA MS-DOS calibration software:

A) Start from MS-DOS

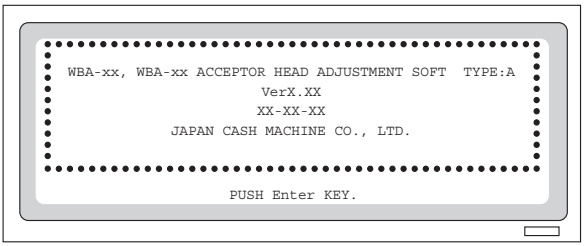
1) Turn on the PC and start MS-DOS. See your PC and MS-DOS manuals to find out how to start MS-DOS.
2) Insert the floppy disk containing the calibration program to the PC's floppy drive.
3) Change the current drive to the drive in which you have inserted the floppy disk (if it is A drive, enter A:).
4) To start calibration of WBA-12/13, enter "ADJ10" and press [ENTER].
To start calibration of WBA-22/23/24/25, enter "ADJ20" and press [ENTER].

B) Start by double-clicking the calibration program *(Use at own risk)*

1) Turn on the PC and start Windows 98/2000/Me/XP.
2) Insert the floppy disk containing the calibration program to the PC's floppy drive.
3) Double-click the file to start the program ("ADJ10" for WBA-12/13, "ADJ20" for WBA-22/23/24/25).

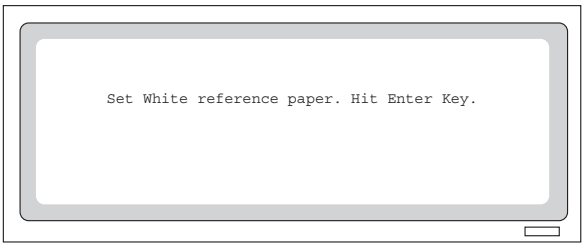
5. MS-DOS Calibration procedure

(1) When the calibration program starts, screen 1 appears. Check the software name, type, and version number. To end the software without making calibration, press [ESC].



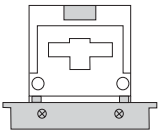
<scr 1>

(2) Press the [ENTER] key. Screen 2 appears.

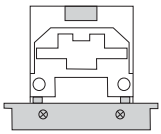


<scr 2>

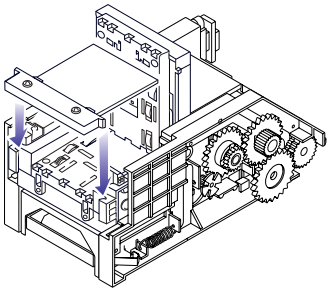
(3) Insert the white calibration paper ("KS-030" for WBA-12/13 and "KS-032" for WBA-22/23/24/25) as shown below, and close the acceptor head. Make sure that the tabs on both side of the acceptor head are firmly locked.

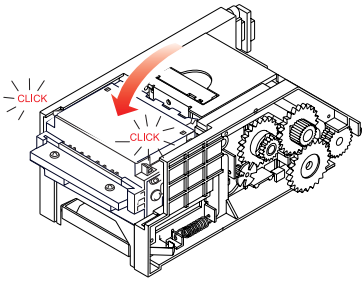


KS-030
(Part#: 055155)

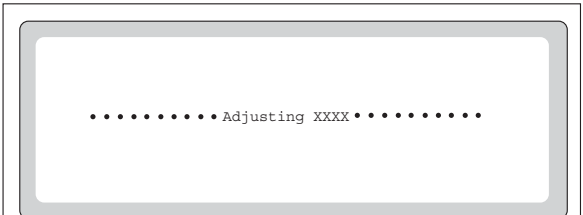


KS-032
(Part #: 057487)



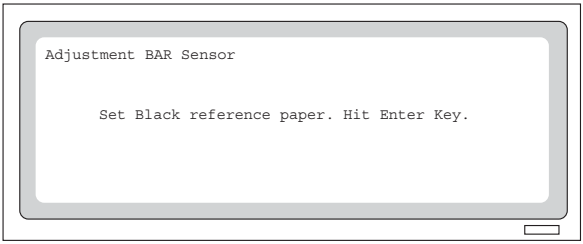


. (4) Press the [ENTER] key to start calibration. Do not move the acceptor head and calibration paper during calibration.



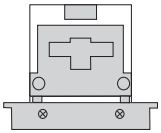
<scr 3>

(5) When screen 4 appears, insert the black calibration paper.

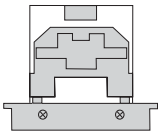


<scr 4>

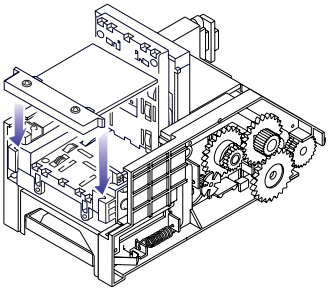
Close the acceptor head. Make sure that the tabs on both side of the acceptor head are firmly locked.

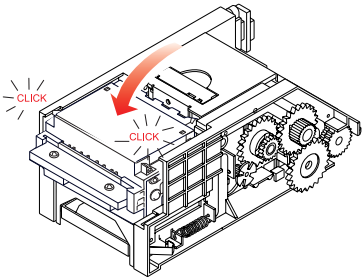


KS-031
(Part #: 055156)

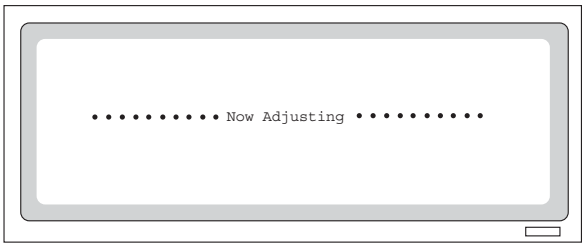


KS-033
(Part #: 057485)



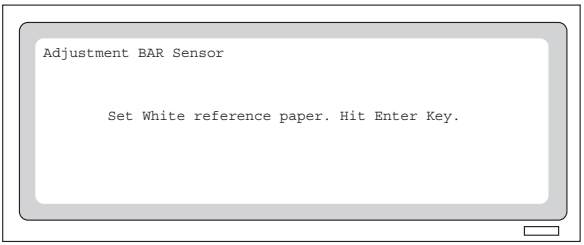


(6) Press the [ENTER] key to start calibration. Do not move the head and calibration paper during calibration.



<scr 5>

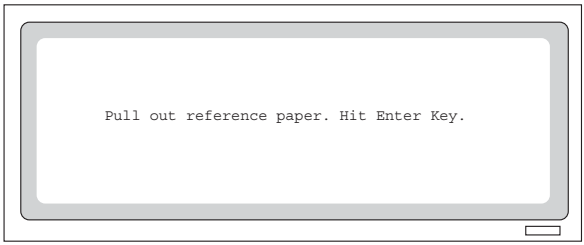
(7) When screen 6 appears, remove the black reference paper and insert the white calibration paper again and press the [ENTER] key.



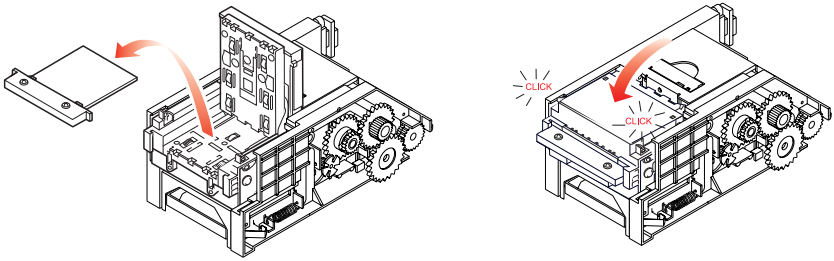
<scr 6>

(8) Press the [ENTER] key to start calibration. Repeat the steps (5) to (8) three to five times until screen 7 appears.

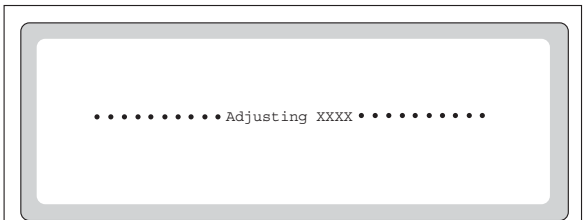
(9) When screen 7 appears, calibration with black and white calibration papers is complete. Remove the calibration paper and close the acceptor head. Make sure that the tabs on both side of the acceptor head are firmly locked.



<scr 7>

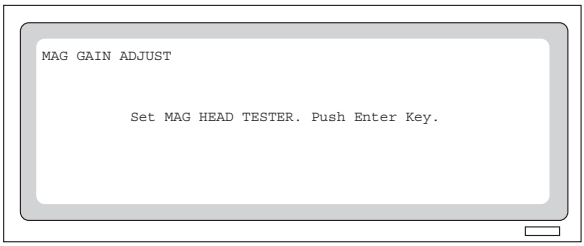


(10) Press the [ENTER] key to start calibration without calibration paper (no paper calibaration).



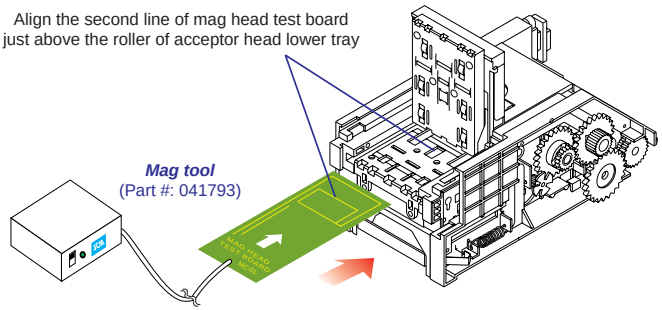
<scr 8>

(11) When the calibration is complete, the screen 9 appears.

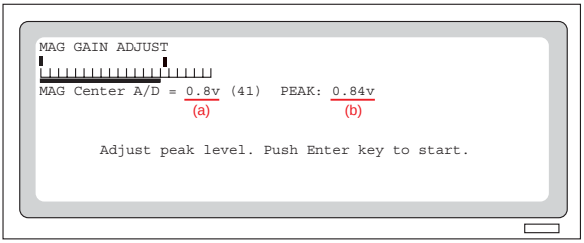


<scr 9>

(12) Calibrate the magnetic sensor(s). Insert the mag head test board to the acceptor and find a location where the second line of mag head test board just above the roller of acceptor head lower tray (show the diagram below) Make sure that the tabs on both side of the acceptor head are firmly locked. ***Closing the acceptor head after the calibration starts results in an error***.

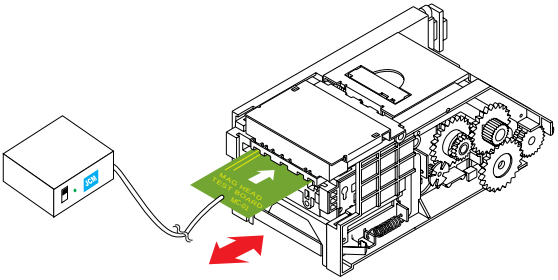


(13) Press the [ENTER] key. Screen 10 appears. (a) shows the current value and (b) shows the peak value detected after the mag board has been inserted.



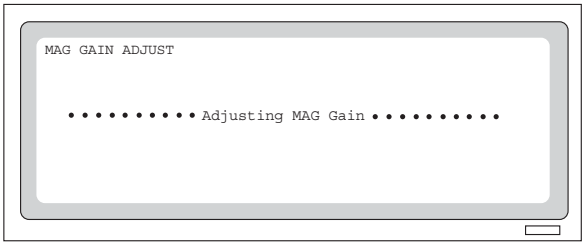
<scr 10>

(14) Slowly move the mal-head test board back and forth to find the peak value. ***The peak value (b) should be between 0.5V and 1.2V.***



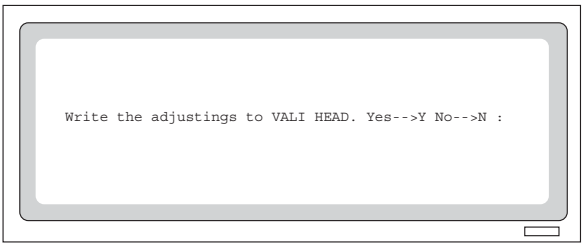
(15) Continue to move slowly the MAG head test board back and forth several millimeters to find the position ***where the "MAG Center A/D" value enters the range within -0.1V in relation to the peak value***.

(16) When the “MAG Center A/D” value enters the designated range, press the [ENTER] key. The calibration starts and screen 11 appears.



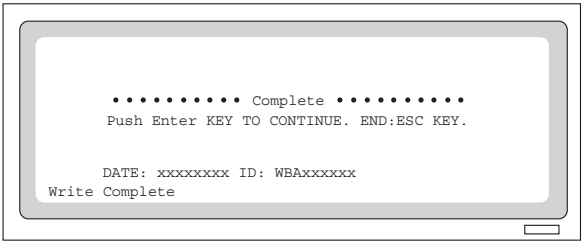
<scr 11>

(17) When the calibration is complete, screen 12 appears. A prompt asks if the calibration results should be written in the acceptor head memory. Press the [Y] key and then [ENTER] to write the data to memory. If you choose [N], all the calibration data will be lost when the power turns off.



<scr 12>

(18) When the screen 13 appears, all calibration procedures are complete. If you wish to continue calibration with another acceptor head, press [ENTER] and replace with a new acceptor head. To end calibration procedure, press [ESC].



<scr 13>

6. When using Windows Calibration Program (AdjMenu(V***).exe

(1) Confirm that all the following programs are in the same folder.

- AdjMenu(V***).exe (Ver1.01 or higher)
- Adj10win_e.exe
- Adj20win_e.exe
- WBANO.DAT *1

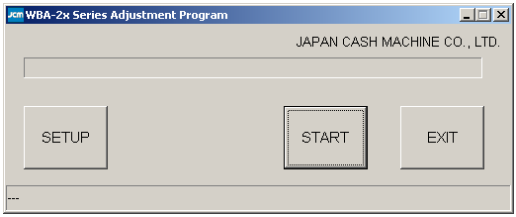
*1 If there is no WBANO.DAT, open a text file (.txt) and save the file name as WBANO and the file expansion as .DAT.

(2) Double click the AdjMenu(V***).exe and then the following window will appear.

(3) Push the [WBA-10] or [WBA-20] button depending on your WBA type.

7. Calibration Procedure for Windows

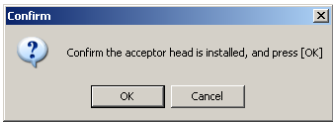
(1) When pushing the [WBA-10] or [WBA-20] button, the following window will appear. The WBA-20 Calibration screens are used in the following steps as an example.



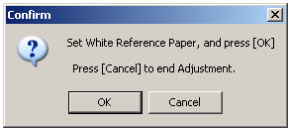
(2) Push the [SETUP] button to set the COM Port No. connecting with your WBA.

(3) Select the COM Port No. from the pull-down menu.

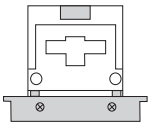
(4) Push the [START] button to start calibration and then following message window will appear.



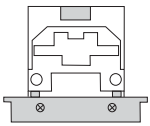
(5) Confirm the acceptor head is installed and then push [OK] button. Then the following message window will appear.



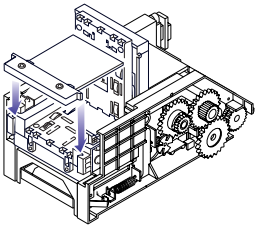
(6) Set the white reference paper (KS-030 for WBA-1X, KS-032 for WBA-2X) as shown below and then close the acceptor head lid close firmly.

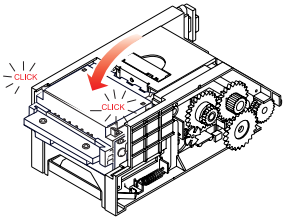


KS-030
(Part#: 055155)



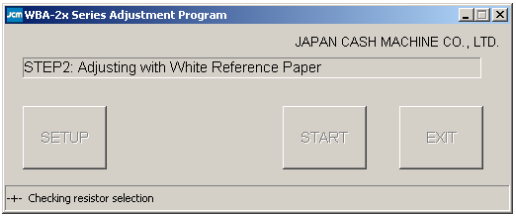
KS-032
(Part #: 057487)



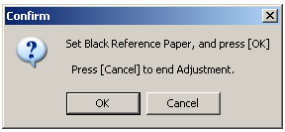


(7) Push the [OK] button of the message window to start the white paper calibration.

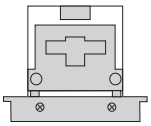
(8) Then the following window will appear and the white paper calibration will start.



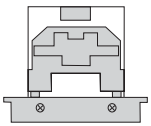
(9) When complete the white paper calibration, the following message window will appear.



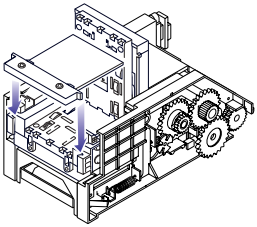
(10) Set the black calibration paper (KS-31 for WBA-1X, KS-33 for WBA-2X) as shown below and then close the acceptor head lid firmly.

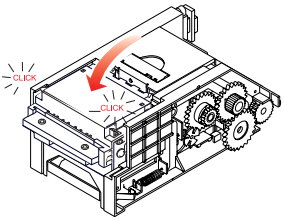


KS-031
(Part #: 055156)

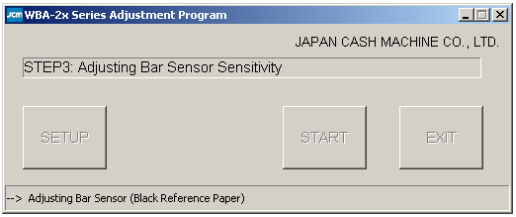


KS-033
(Part #: 057485)

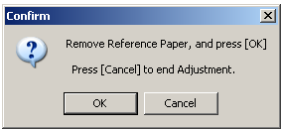




(11) Then push the [OK] button of the message window to start the black paper calibration.
(12) Then the following window will appear and the black paper calibration will start.

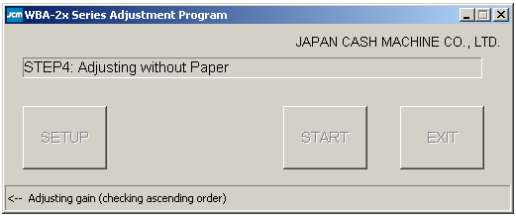


(13) Repeat the steps (5) to (9) several times and then the following message window will appear.

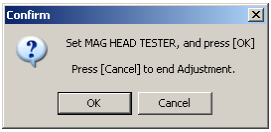


(14) Remove the calibration paper and then push the [OK] button.

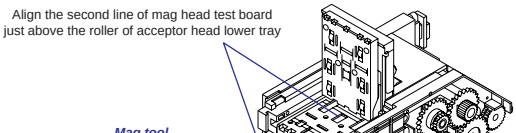
(15) The following window will appear and no paper calibration will start.



(16) When complete the no paper calibration, then the following message window will appear.



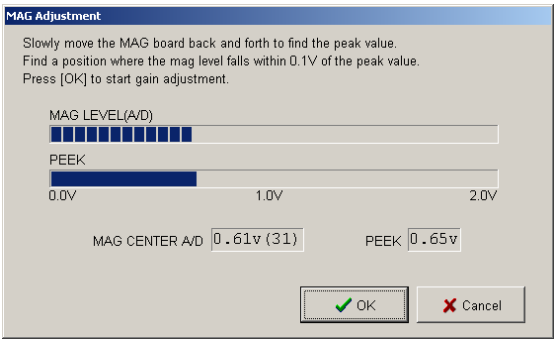
(17) Set the MAG head test board of MAG HEAD TESTER as shown below and close the acceptor head lid firmly.



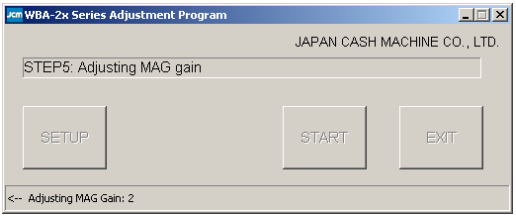
(18) Then push the [OK] button of the message window to start the mag sensor calibration.

(19) When the following window appear, move the mag head board back and forth to find the peak value. The peak value should be between 0.5V and 1.2V.

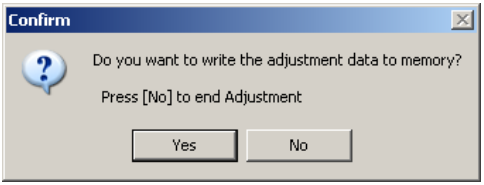
(20) Continue to move the mag head board slowly back and forth to find the MAG LEVEL position where it is within -0.1V of the peak value. For example, if the peek level is 0.65V, find the position of the MAG LEVEL is between 0.55 to 0.65V



(21) When the values are fixed, push [OK] button to start the MAG sensor calibration.

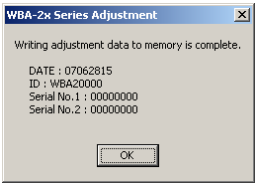


(22) When the MAG calibration is completed, the following message window will appear.

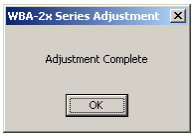


(23) Push the [YES] button to write the calibration data to the WBA memory.

(24) Then the following message window will appear and then push the [OK] button.



(25) The following message window will appear and push the [OK] button.



(26) This is the end of the calibration. Push the [Exit] button to close the calibration program.

8. Error Messages

xxxxx Communication Error xxxxx: Communication with WBA has failed.

=> Check all the connections. Make sure you have executed the correct calibration program.

xxxxx Adjustment Error (Gain) xxxxx: Gain calibration error

=> Make sure you have correctly inserted white calibration paper as instructed by the monitor.

xxxxx Adjustment Error (Black Level) xxxxx: Black level calibration error

=> Make sure you have correctly inserted black calibration paper as instructed by the monitor.

xxxxx Adjustment Error (No paper) xxxxx: No paper level calibration error

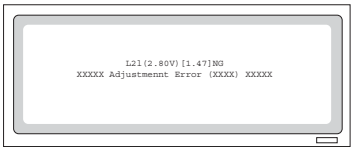
=> Make sure you have removed calibration paper.

xxxxx Adjustment Error (MAG) xxxxx: Magnetic head calibration error

=> Make sure you have correctly inserted mag head test board as instructed by the monitor.

When an calibration error occurs, the sensor signal name and signal value involved in the calibration error will be displayed on the line above the message “xxxxx Adjustment Error (XXXX) xxxxx.”

Example of error message:



9. Sensor Signal Name and Sensor Name Conversion Table

Sensor signal name	Sensor name
C2I	HPC,LEC
R2I	HPR,LER
L2I	HPL,LEL
C2R	HPC,LEC
R2R	HPR,LER
L2R	HPL,LEL
A	PT1,LE1
B	PT2,LE2
BUR	HBAR
CDR	HPC
RDR	HPR
LDR	HPL

WBA-1 * -SS

Sensor signal name	Sensor name
C2I	UHPC, DHPC
C2R	
CUI	UHPC
CUR	
CDI	DHPC
CDR	
R2I	UHPR, DHPR
R2R	
RUI	UHPR
RUR	
RDI	DHPR
RDR	
L2I	UHPL, DHPL
L2R	
LUI	UHPL
LUR	
LDI	DHPL
LDR	
R2E	PT1
L2E	PT2
R2A	PT3
L2A	PT4
BUR	HBAR

WBA-2 * -SS

10. Description - donwloading to flash memory

This section describes how to download software program to the Flash ROM of the CPU board.

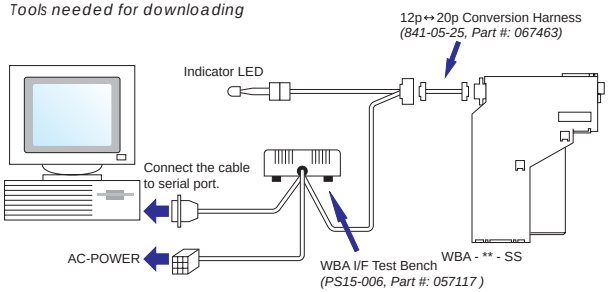
WHEN TO DOWNLOAD

- Software Upgrade
- After a CPU board has been replaced

****This paragraph describes the method of using WBA I/F test bench. For the method 2), see a separate instruction manual of DT-004.***
****This paragraph is for Flash Rom models only (WBA-12/22/24).***

11. Tools needed

Tools needed for downloading



PC: IBM PC/AT and compatibles
The PC must have 1 or more RS-232C communication ports (D-sub pin).

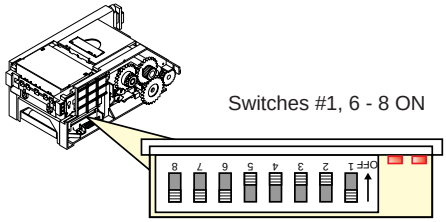
Communication port address: 3F8 to 3FF (serial port 1)
2F8 to 2FF (serial port 2)
OS: MS-DOS Version 5.x/6.x or Windows98/2000/XP.

12. Enable WBA Download Mode

(1) Refer to the diagram above to properly connect the cables / harnesses.

Make sure the power of PS15-006 / host machine is OFF when connecting the harness to the WBA. Failure to do so may cause electric shock and/or permanent damage to the device.

Location of DIP switches



(2) Set the CPU board DIP switches 8, 7, 6 and 1 ON and switches 5 to 2 OFF. This way the baud rate is set to 38400bps. Note the baud rate of 38400bps is available for 4M Flash Rom only (WBA12/22/24).
(3) Supply power to the unit.
(4) The CPU board LED 1 and LED 2 flash alternately and the forced download mode starts.
(5) Save the download program (DWN.exe) and the software into a floppy drive (or the same directory).

13. When using MS-DOS Download Program (DWN.exe)

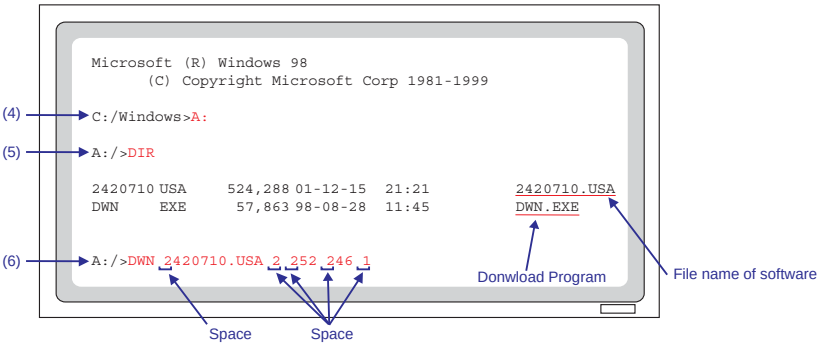
There are 2 ways to start the WBA download program from MS-DOS. For downloading from Windows, refer to 1

A) Start from MS-DOS

1) Turn on the PC.
2) Insert the floppy disk containing the download program (DWN.exe) and the software to the PC's floppy drive.
3) Start MS-DOS. See your PC and MS-DOS manuals to find out how to start MS-DOS.
4) When the MS-DOS menu appears, type "A" and press [ENTER] (when your floppy disk is in "A" drive).
5) Type "DIR" and press [ENTER]. The list of file names in the floppy disk appears.
6) Find the file name of software and enter the parameters as shown in the diagram below. For example, if the file name is 2420710.USA, and the serial port number is 1, type as:
DWN 2420710.USA 2 252 246 1 [ENTER]

B) Start from Windows98 MS-DOS Prompt or Windows 2000/Me/XP Command Prompt Menu
(Use at own risk)

1) Turn on the PC and start Windows 98/2000/Me/XP.
2) Insert the floppy disk containing the download program (DWN.exe) and software to the PC's floppy drive.
3) Start MS-DOS Prompt or Command Prompt from START menu of Windows.
4) When the MS-DOS/Command Prompt menu appears, type "A:" and press [ENTER] (when your floppy disk is in A drive).
5) Type "DIR" and press [ENTER]. The list of file names in the floppy disk appears.



14. MS-DOS Download procedure

Find the file name of software and enter parameters as shown in the diagram below. For example, if the file name is 2420710.USA, and the serial port number is 1, type as:

DWN 2420710.USA 2 252 246 1 [ENTER]

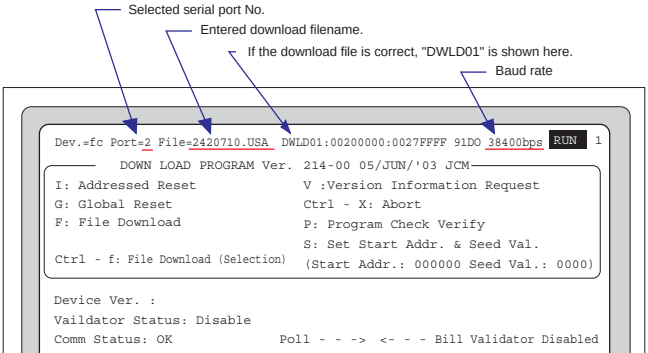
Explanation of Parameters: **DWN File name [baud rate] [address] [size] [port] [ENTER]**

File name	Download file name.	(Must be specified.)
[baud rate]	Baud rate 0: 9600bps, 1:19200bps, 2: 38400bps	Default: 0
[address]	Fixed at 252 (FC hex.).	Default: 252
[size]	Fixed at 246.	Default: 246
[port]	Serial port number	Default: 2

Execution Screen

When the program starts, the following screen appears.

Note: If the download file is correct, “DWLD01” appears on the top line.


Selected serial port No.
Entered download filename.
If the download file is correct, "DWLD01" is shown here.
Baud rate
Dev.=fc Port=2 File=2420710.USA DWLD01:00200000:0027FFFF 91D0 38400bps RUN 1
DOWN LOAD PROGRAM Ver. 214-00 05/JUN/'03 JCM
I: Addressed Reset
G: Global Reset
F: File Download
Ctrl - f: File Download (Selection)
V :Version Information Request
Ctrl - X: Abort
P: Program Check Verify
S: Set Start Addr. & Seed Val.
(Start Addr.: 000000 Seed Val.: 0000)
Device Ver. :
Vaildator Status: Disable
Comm Status: OK
Poll - - -> <- - - Bill Validator Disabled

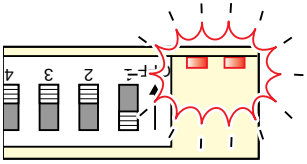
Operation:

Use the letter keys to enter a command.

I: Addressed Reset - Reset a selected unit in the game machine.
V: Version Information Request - Reads the program version after downloading is complete.
G: Global Reset - Reset all the units (including WBA) connected to the host controller
Ctrl + X: Abort - Exit the program.
F: File Download - Downloads the specified file.
P: Program Check Verify - Check CRC by the WBA itself.
Ctrl + F: File Download (Selection) - *DO NOT USE THIS COMMAND*
S: Set Start Addr. & Seed Val. - The start address and initial value of CRC when checking CRC.

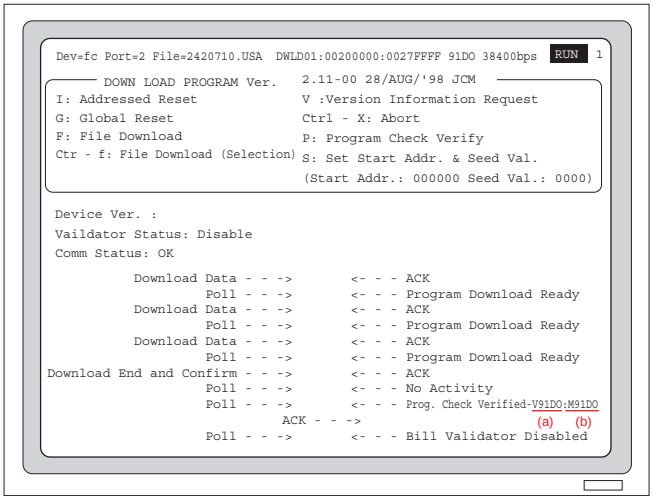
(1) Press F key (capital letter) to start the download program.

(2) Downloading starts. The LEDs 1 and 2 on the CPU board flashes alternatively.



(3) When the downloading is completed successfully, LED1 and LED2 flash in unison.

(4) "CRC" appears on the monitor.



(a) V＊＊＊: CRC value calculated by WBA
(b) M＊＊＊: CRC value calculated by PC

If the downloading is completed successfully, the CRC* values of (a) and (b) should be the same.

(5) The downloading is complete. Press the "Shift" V key to verify the update if necessary.

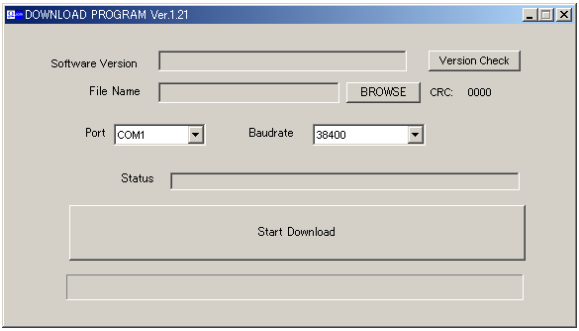
(6) Exit the program (Ctrl - X).

Reference: "CRC" is an error correction method for checking whether or not data is correctly transmitted.

15. When using Windows Download Program (DOWNLOAD(V1.2*).exe)

(1) Copy the Download Program Ver. 1.2*.exe and wba_download_config.txt to your PC.

(2) When double clicking the DOWNLOAD(V1.2*).exe and then the following window will appear.



(3) Push the [Version Check] button and confirm the current software version of your WBA.

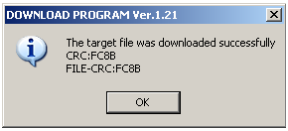
(4) Push the [BROWSE] button to select new software you want to download to your WBA.

(5) Confirm the COM port number of you PC which WBA is connecting and select the comport number from the pull-down menu.

(6) Select the baud rate 38400 from the pull-down menu.

(7) Push the [Start Download] button to start downloading.

(8) When the downloading is completed successfully, the following message window will appear.



(9) Push the [OK] button and exit the download program.

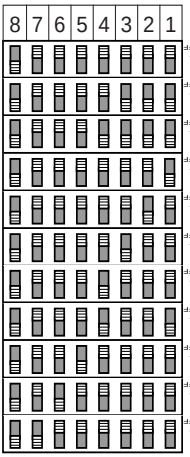
16. Setting the WBA DIP Switches

1. Test Mode

Selecting the test mode

1. Set DIP switch 8 to ON and switches 1 to 7 to OFF.
2. The indicator LED will flash.
3. Set DIP switches to the test mode setting you want to execute.
4. Set DIP switch 8 to OFF.
5. The test mode starts.

Setting the test mode.



On-line test

Transport unit/acceptor head bill acceptance operation test (See Error Code Table 1 and 3.)

Bill acceptance test of unit with cash box (See Error Code Table 1 and 3.)

Transport motor forward rotation test

Transport motor reverse rotation test

Stacker up/down test

Acceptor head/stacker test (See Error Code Table 2.)

Stacker test (without acceptor head)

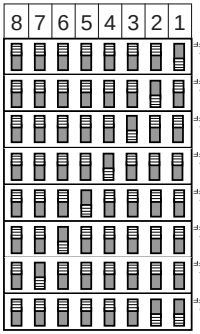
Solenoid test

Acceptor head sensor test (PH06)
See “Details about the Acceptor Sensor Test (PH06).”
Stacker sensor test (PH07)
See “Details about the Stacker Sensor Test (PH07).”

Details about the Acceptor Sensor Test (PH06)

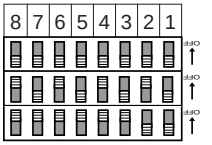
	WBA-10	WBA-20
8	PLEV	FLEV
7	Reserved	PT3
6	PT1	PT4
5	PT2	PT1
4	HPL	PT3
3	HPR	UHPL,DHPL
2	HPC	UHPR,DHPR
1	Reserved	UHPC,DHPC

Details about the Stacker Sensor Test (PH07)



Feed in sensor
Solenoid lever
Feed out
Stacker home
No cassette
Validator encoder
Stacker encoder
Acceptor head detached signal

DIP switch input test



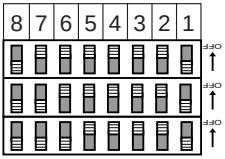
Change the DIP switch settings in the order of 1, 2, and 3.
If the test is successful, the LED turns ON.

Serial port loopback test

If the test is successfull, the LED turns ON.

2. Download Mode

Forced download mode



(baud rate 9600bps: for WBA10/20 only)
(baud rate 19200bps: for WBA10/12/20/22/24)
(baud rate 38400bps: for WBA12/22/24 only)

17. Error Code

Error Code Table 1

Error Code Table 1 summarizes the error codes of the receiving operations of the transfer unit/acceptor headpiece and the unit with cash box.

No. of indicator LED flashes	Description
1	Cash box full
2	Stacker jam, or pusher unit problem.
3	Transport cover is open, or stacker lever problem.
4	Jam in the acceptor head.
5	The acceptor head is detached or it has been calibrated, or wrong acceptor head type.
6	Transport motor problem. The pulse signal is not sent from the encoder sesor.
7	Reserved.
8	Stacker lever problem.
9	Reserved.
10	No cash box.
11	Reserved.
12	Reserved.

Error Code Table 2

Acceptor head and stacker test.

No. of indicator LED flashes	Description
1	Reserved.
2	Stacker lever problem.
3	Jam in the acceptor head.
4	Cash box jam.
5	Cash box full.
6	Pusher mechanism problem.
7	The acceptor head is detached or it has not been calibrated, or wrong acceptor head type

Error Code Table 3

Return code.

Number of pulses	Reason for return
1	Crooked insertion
2	Magnetic pattern error
3	A sensor other than DT1, PT2 detected a bill while the acceptor was on standby.
4	The dark-light ratio of the bill is below the fixed value
5	(1) The *HPC sensor did not detect the bill within the specified period after it was initially taken in. (2) The *HPL *HPR, did not delect the bill within the specified period after it was initially taken in. (3) The feed sensor did not detect the bill within the specified period after it was initially taken in.
6	Reserved
7	Error in a photosensor
8	Level error; the bill is unusually dirty. Two overlapping bills were detected.
9	Returned an illegal bill type.
10	Reserved
11	Stacker lever trouble.
12	None of the *HPR, *HPC, nor *HPL detected a bill when the type of bill signal is output. The feed-in sensor stops detecting a bill before the *HPC sensor during transfer of bill to cash box. The HPC sensor detected a bill again during transfer of bill to cash box.
13	Bill length error.
14	Color pattern error.

18. Sensor, Board, and Motor Locations